

Higher fungi in Mt. Chilgap

*Soon-Ja Seok, Yang-Sup Kim and ¹Kyong-Jun Lee

*Agricultural Biotechnology Institute, RDA, Suwon

¹College of Agricultural and life Sciences, Seoul National University

七甲山 地域의 高等 菌類(1)

*石順子 · 金養燮 · ¹李景俊

*農業遺傳工學研究所, 水原

¹서울대학교 農業生命科學大學

ABSTRACT: In order to investigate the fungal Flora in Mt. Chilgap, which located in the middle west of Korea. Authors had collected wild mushrooms, during the mushroom-growing season, June, July and October, 1991. Six species new to the Korean flora are identified as follows: *Callistosporium luteoolivaceum* (Berk. & Curt.) Sing; *Volvariella subtaylori* Hongo; *Psathyrella subatrata* (Batsch) Gill.; *Volvariella surrecta* (Knapp) Sing.; *Boletellus elatus* Nagasawa; *Xerocomus parvulus* Hongo, and *Callistosporium* Sing. is also new genus to the Korea. All the collections cited are deposited in ASIK herbarium.

KEYWORDS: Mt. Chilgap agaric fungi, *Callistosporium* Sung. *Callistosporium luteoolivaceum*(Berk. & Curt.) Sing. *Psathyrella subatrata*(Batsch) Gill. *Volvariella subtaylori* Hongo in Journ. *Volvariella surrecta*(Knapp) Singer in *Lilloa Xerocomus parvulus* Hongo in Journ. *Boletellus elatus* Nagasawa

겨자버섯속(신칭) *Callistosporium* Sing. in *Mycologia* 36: 367. 1944. *Sydowia* 30: 261-264. 1977.

Characters : Pileus hygrophanous or non hygrophanous, pileal cuticle consisting of repent, elongate hypha, sometimes with peg-like hyphal peg bundles, hymenophore lamellate, lamellae subdecurrent to narrowly adnexed or emarginate. Spore print white when fresh. Spores ellipsoid, smooth, inamyloid, at times partly bright colored by the pigment dried specimens, thin, hyaline walls, uninucleate, weakly cyanophilic. Basidia normal, Cystidia of all types absent. Hymenophoral trama regular, inamyloid. Stipe central, thin, fleshy-fragile, subcartilaginous. Context not tough, not reviving. Hyphae without clamp connection. Habit of carpophore collybioid. Pigment present, abundant, changing its color in dried specimens. On the stumps, on sphagnum and on the earth.

*Corresponding author

Type species : *Gymnopus palmarum* Murr.

[*Callistosporium palmarum*(Murr.) Sing.]

1. 작은겨자버섯(신칭) *Callistosporium luteoolivaceum*(Berk. & Curt.) Sing. *Loydia* 9.117, 1946.

Pileus 14~22 mm wide, at first semiglobose to convex, plano-convex, to nearly becoming plane, at times slightly depressed at center, thin, surface smooth, moist and translucent striates when wet, greyish yellow(4C4) to champagne(4B4), paler when dry, hygrophanous. Context thin, concolorous with the pilial surface. Odor and taste indistinct.

Lamellae adnate, subcrowded, narrow, rather thick, edge smooth, greyish orange(5B3) to dark blonde(5C4), lamellulae 2-tiers. Stipe 30~45×1.5~2 mm, equal, subtapering upwards, slightly thickened downwards, at times somewhat curved, surface smooth, moist when wet, longitudinally striates, with white hairy at the base, dark blonde

(5D4), to clay(5D5), paler at apex, central. Context subcartilaginous, concolous with stipe surface, becoming hollow.

Spore print whitish cream, spores $4.5\sim 6\times 3\sim 4.5\ \mu\text{m}$, ellipsoid to ovoid-ellipsoid, smooth, inamyloid, with brownish oil drop. Basidia $19\sim 19.5\times 5.6\sim 6.1\ \mu\text{m}$, normal, 1-or 4-spored, with dark brown pigment in KOH. Pleurocystidia absent. Cheilocystidia $1.5\sim 2\ \mu\text{m}$ broad, cylindric, flexure, bundles, thin walled. Hymenophoral trama parallel. Stipitipellis $16\sim 22\sim 1.3\sim 2.2\ \mu\text{m}$, subcylindric, flexure, thin walled. Pileipellis $17.6\sim 37.2\times 4\sim 5\ \mu\text{m}$, cylindric, subcapitate, somewhat trichoderm, thin walled. Hyphae without clamp connection.

Habit & Habitat : Gregarious on the stumps of coniferous woods.

Materials examined : Mt. Chilgap, Chongyang-gun, Chungnam Pro. July 27. 1991(ASIK:4019), Coll. by S. J. Seok

Observation : This species is easily recognized by almost the same color of pileus, lamellae and stipe and its habitat of growing on the stumps of conifers

2. 각모눈물버섯(신칭) *Psathyrella subatrata*(Batsch) Gill. in *Hymenomyc.*; 616, 1878.

[=Syn. *Psathyrella conopilus*(Fr. : Fr.) Pears. & Dennis in *Trans. Brit. mycol. Soc.* 31: 185. 1948.]

Pileus 23~32 mm broad, 15~20 mm high, broadly conic to conic in young stage, paraboloid-conic to conico-campanulate in mature, smooth, translucent striates when wet, finely radially wrinkled when dry sometimes slightly micaceous, dark reddish brown, soonly orange grey(5B2) to greyish orange(5B3) when dry, without pink on drying. Context dark reddish brown to sordid white. Taste and odor indistinct.

Lamellae adnate, close, ventricose, in young pale brown, at mature dark brown(7F4-5), with white fimbriate edge, lamellulae usually 2-tiers. Stipe $80\sim 120\times 2\sim 3\ \text{mm}$ at apex, cylindric, slightly subbulbous at base, dry, silky shiny, with pruinose and often finely striates at apex, often twisted, white or whitish, often abelline downward, central, later hollow, cartilaginous, veil absent.

Spore print black. Spores $14\sim 15\times 7.8\sim 9.5\ \mu\text{m}$,

ellipsoid in side view oblong-ovoid in profile, varying form, smooth, thin-walled, with desinctly small apical germ pore, dark reddish brown in water. Basidia $22\sim 40\times 11\sim 15\ \mu\text{m}$, somewhat spheropedunculate, 4-spored., Pleurocystidia absent. Cheilocystidia $30\sim 53\times 12\sim 13\ \mu\text{m}$. numerous, ventricose, subtriform, subfusiform, thin-walled. Hymenophoral trama yellowish brown in NH_4OH . Pileipellis $28\sim 58\times 14\sim 20\ \mu\text{m}$ palisadoderm, consisting of pedicellate, thin walled, clavate cells, brown in NH_4OH . Setae scattered between cells of pileipellis $2\ \mu\text{m}$ thick, $82\sim 184\ \mu\text{m}$ long, at times up to $400\ \mu\text{m}$ long, gradually tapering from the base($6.5\sim 9.5\ \mu\text{m}$ thick) towards apex($2.5\sim 3.2$ thick).

Habit & Habitat : Scattered or gregarious in humus soil, on decaying materials, in deciduous woods, Summer to Autumn.

Materials examined : On stumps of dead wood, Mt. Chilgap, Chongyang, Chungnam Pro. Oct. 1991, (ASIK 4106) Coll. by S. J. Seok

Observation : This taxa is easily distinguished from other species of subsection Subatrata, which having fulvous-walled setae on the pileus, in typically scattered to gregarious habitat.

3. 각시풀버섯(신칭) *Volvariella subtaylori* Hongo in *Journ. Jap. Bot.* vol. 35(3), 88-89, 1960

Basidiomes in egg stage globose, subglobose to ovoid, greyish to brownish grey, then becoming cracked on the top of the egg-shape from which the stipe and pileus appearing Pileus 15~40 mm wide, at first semiglobose to convex, then expanding nearly flat with umbo at center, dry, chocolate brown(6F4) to greyish brown(7F3) fibrillose in young, covered with greyish brown(8F3) fibrillose to villose around center, margin strigose-rimose, on the whitish to yellowish white ground color. Context thin, whitish, fleshy at center, very thin toward margin. Lamellae free, subcrowded, ventricose, white when young, then orange white to pale orange(6A2-3), edge fimbriates, lamellulae rarely 1-tiers, well developed. Stipe $25\sim 40\times 1.5\sim 2\ \text{mm}$, equal, cylindric, tapering upward, dry, silky shiny, longitudinally striates, with minutely hairs, central, becoming hollow. Volva membranous, gre-

yish brown(8F3), lobed, the base of volva paler to whitish, covered with minute hairs.

Spore print fleshy sordid. Spores $6.5\sim 7\times 4.3\sim 4.8\ \mu\text{m}$, subovoid to ellipsoid, smooth, thin-walled. Basidia $20\sim 27\times 9\sim 10\ \mu\text{m}$, 4-spored, stout, without basal clamp. Pleurocystidia absent. Cheilocystidia $51\sim 70\times 12\sim 20\ \mu\text{m}$, numerous, ventricose, narrowly lageniform, with short of somewhat narrowly neck with round apex, thin-walled, hyaline in KOH, pilial epicutis cylindrical, $12\sim 19\ \mu\text{m}$ wide, thin-walled. Hyphae without clamp connection.

Habit & Habitat : Solitary or somewhat grouped on the sand soil, on or around the buried oak logs inoculated by *Ganoderma lucidum* in polyethylene house, uncommon, summer.

Materials examined : Dep. of Applied Mycology, Mt. Chilgap, Chongyang-gun, July 9. 1991. (ASIK 4027), Coll. by Y. H. Park

Observation : The present species is closely similar to *V. taylori* (Berk) Sing, but differs in the smaller size of carpophores, the darker pileal color, the villose volva, and the stipe with minute hairs.

4. 갈때기풀버섯(신칭) *Volvariella surrecta*(Knapp) Singer in *Lilloa* 22(1949): 401, 1951

[=Syn.: *Agaricus surrectus* Knapp, The Journal of a Naturalist: 363, 1829; *Volvaria surrecta* (Knapp) Ramsbottom in TBMS 25: 326, 1942; *Agaricus loveianus* Berkeley, in J. E. Smith, English Flora 5(2): 104, 1836; *Volvaria loveiana*(Berk.) Gillet, Hymenomycetes de France: 386, 1874; *Volvaria hypopithys* subsp. *loveiana*(Berk.) Konr. & Maubl., Icones Selectae Fungorum: Pl. 17, 1927]

Pileus $25\sim 35\ \text{mm}$ ($30\sim 80\ \text{mm}$)wide, at first conic to conico-campanulate, then expanded-convex to plane, very often papilar to broadly umbonate or at times slightly depressed in center. greyish white to whitish then discolouring grey to at times pale cream but often pale greyish buff in center, with appressed greyish fibrillose, especially just at margin, or smooth, margin appendiculate. Context white, fleshy, odor slightly similar to *Pleurotus ostreatus*. Taste mild. Lamellae free, subcrowded to crowded, white then salmon to sordid, edge white, fimbriate to flocculose, lamellulae 1-or 2-

tiers. Stipe $50\sim 57\times 2\sim 2.7\ \text{mm}$ (at apex), cylindrical, somewhat equal or attenuated upwards, but somewhat thickened at base, white then discolouring pale fawn, at apex finely pruinose, but silky-tomentose near the base. Volva white, membranous, at times discolouring very pale cream, margin two or three lobed.

Spore print sordid. Spores $4.8\sim 5.1\times 3.2\sim 3.7\ \mu\text{m}$, smooth, ellipsoid to ovoid, somewhat slightly thick-walled. Basidia $18.6\sim 26\times 7.4\sim 8.4\ \mu\text{m}$, normal, four-spored. Pleurocystidia $42\sim 53\times 12\sim 23.3\ \mu\text{m}$, lageniform, with apex subcapitate to broadly obtuse, thin-walled. Cheilocystidia $35.3\sim 45.6\times 9\sim 17\ \mu\text{m}$, sublageniform with subcapitate or fusiform-ventricose with long neck, sometimes hexuous, thin-walled bundle. Pileipellis of pileus $56\sim 123\times 11.3\sim 18\ \mu\text{m}$, cylindrical to filamentous, thin-walled, without clamp-connection.

Habit & Habitat : Solitary, on or near the old fruit-bodies of *Clitocybe*

Materials examined : Mt. Chilgap, Chongyang-gun, Chungnam Pro., Oct. 7. 1991. (GBDS:1615) Coll. by S. J. Seok

Observation : This species is easily recognized by its habitat, white pileus and silky tomentose on the base of stipe.

5. 칠갑산그물버섯(신칭) *Xerocomus parvulus* Hongo in *Journ. Jap. Bot.* Vol. 38(8) 9-16, 1963.

Pileus $19\sim 25\ \text{mm}$ wide, at first convex then becoming plano-convex to nearly flat, surface dry, minutely tomentose felty, later glabrous, light brown(6D4-5), at first clay-olive to pale reddish brown, finally brown(6F4-5) when old. Context thick, pale yellow, but changed slightly blue-green when cut. Odor and taste indistinct.

Tube adnate, short decurrent, at times depressed around stipe, pale yellow, the later lemon yellow., Pores angular, large, $1\sim 2.5\ \text{mm}$, changed slightly bluish or not.

Stipe $20\sim 50\times 3\sim 7\ \text{mm}$, dry, dingy yellow, to dingy brown, at times tinged pale reddish at apex, smooth to finally fibrillose substriates. Context somewhat cartilaginous, dingy yellowish, later dingy brown.

Spore print olive. Spores $8.5\sim 10.5\times 5.2\sim 5.7$

μm , ovoid-ellipsoid, thin-walled, inamyloid, Basidia $35\sim 42\times 9.5\sim 12\ \mu\text{m}$, 4-spored, without basal clamp connection. Pleurocystidia $72\sim 150\times 10\sim 15\ \mu\text{m}$, narrowly fusiform, thick-walled, hyaline. Cheilocystidia $39\sim 56\times 7\sim 15\ \mu\text{m}$, subfusiform, subcylindrical to unguulate, somewhat thick-walled. Pileipellis of *Pileus* trichoderm $5\sim 8\ \mu\text{m}$ thick, cylindrical, thin-walled or thick-walled, without any pigment. Hyphae without clamp connection.

Habit & Habitat : Solitary to a few grouped on the ground under hard wood (especially Fagaceae forest). Summer to early Autumn

Materials examined : Mt. Chilgap Chongyang-gun, Chungnam Pro., July. 26. 1991.(ASIK 4062), Coll. by S. J. Seok

Observation : The present species is easily distinguished from other species of genus *Xerocomus* by the small size of fruit bodies and the short spores.

6. 키다리밤그물버섯(신칭) *Boletellus elatus* Nagasawa

Pileus $30\sim 90\ \text{mm}$ wide, hemiglobose to convex, at times nearly plane, margin somewhat up-turn in age, surface dry, slightly subviscid when wet, felty-tomentose in young, in age nearly glabrous, dark brown(8F4-5) at young, camel to sunburn (6D4-5) in mature. Context fleshy-soft, orange white(6A2), usually unchange when cut. Odor and taste mild. Tube $8\ \text{mm}$ long, adnate to adnexed, depressed around stipe, bright yellow at young, greenish yellow to olive greenish at mature. Pores angular, large, conchous with tube, not changed when touched. Stipe $90\sim 230\times 6\sim 12\ \text{mm}$, tapering upwards, subclavate to clavate($14\sim 40\ \text{mm}$ thick), at times twisted, in young purplish grey upwards, minutely velvety, longitudinally striates and incompletely reticulate at apex, whitish rhizoid like mycelial at the base, central, solid.

Spore print olive brown. Spores $16\sim 18\times 9\sim 10\ \mu\text{m}$, ellipsoid, to subovoid, longitudinally grooved striates, with short or long ones somewhat arranged with twisted with apical germ pore. Basidia $35\sim 37\sim 12\sim 13\ \mu\text{m}$, 2-, 3- or 4-spored without basal clamp connection. Pleurocystidia absent. Cheilocystidia $30\sim 56\times 6\sim 9\ \mu\text{m}$, scattered, subfusi-

form, with long neck, thin-walled. Pileipellis of pileus trichoderm $4\sim 6.5\ \mu\text{m}$ broad, thin walled. Stipe base with basidia $37\times 12.3\ \mu\text{m}$ rarely, generally 2-spored, without basal clamp connection. Caulocystidia $20\sim 68\times 7\sim 12\ \mu\text{m}$, scattered obclavate, trichoderm, utriform, thin-walled. Basidiole present.

Habit & Habitat : Solitary or grouped on the ground in mixed woods. Summer to early Autumn, very common in this area.

Materials examined : Mt. Chilgap, Chongyang-gun, Chungnam Pro., July 27. 1991(ASIK 4049), Coll. by Y. S. Kim and S. J. Seok.

Observation : The species is easily distinguished from other species in the genus *Boletellus* in having the long, large and clavate stipe and the color of cap and stipe, and microscopically with basidia and basidiols on the stipe base.

적 요

칠갑산 지역의 버섯류 분포상을 밝히기 위하여 1991. 6, 7, 10월 3회에 걸쳐 조사하였다. 확인된 버섯류중 한국미기록속인 겨자버섯속 *Callistosporium* Sing.과 한국미기록 6종 작은겨자버섯 *Callistosporium luteoolivaceum*(Berk. & Curt.) Sing.; 각시풀버섯 *Volvariella subtaylori* Hongo; 갈매기풀버섯 *Volvariella surrecta*(Knapp) Sing.; 각모눈물버섯 *Psathyrella subatrata*(Batsch) Gin.; 칠갑산그물버섯 *Xerocomus parvulus* Hongo; 키다리밤그물버섯 *Boletellus elatus* Nagasawa이 확인되어 1차적으로 보고하는 바이다. 본 조사에서 발견된 미기록종은 앞으로 확대조사를 실시하여 칠갑산버섯 목록을 작성하여 보고할 예정이다.

References

- Bas. C. 1985. The Dutch, French and British Species of *Psathyrella*, Rijksherbarium, Leiden 1-300 pp.
 Corner, E. J. H., F. R. S., F. L. S., 1972. *Boletus* in Malasia. 100-101, fig. 33a, Singapore Printing Office.
 Hongo T., 1963. Notes on Japanese larger Fungi(16), Journ. Jap. Bot. Vol. 38(8).
 Hongo T, 1960. Notes on Japanese large Fungi(15), Journ. Jap. Bot. Vol. 35(3).
 Korean Society of Mycology 1978. Suggestion on "Standard Korean Names of Mushroom in Korea"

Kor. J. Mycol. 6: 45-55.

Kornerup, A. & J. H. Wanscher, 1983. *Methuen Handbook of Colour*. 3rd, Edition Fletcher & Son Ltd. Norwich, Great Britain.

Lee, Ji-Yul, 1979. Notes on two Boleti From Korea. *J. Seoul Woman's College* 8: 331-335.

Lee, Eung-Rae and Jeong, Hack-Seong, 1973. Floral studies on the Hydroid Fungi in Korea. *MOST (科學技術處)*, 73-83: 13-46.

Orton, P. D., 1986. *Pluteaceae; Pluteus and Volvariella in British Fungus Flora Agarics and Boleti* 99 pp., Royal Botanic Garden, Edinburgh.

Singer, 1976. *Flora Neotropica*(Monograph No. 17. *Marasmiae*).

Singer, R., 1986. *The Agaricales in Modern Taxonomy*. 4th edition, 1-981.88 pls. K. Scientific Books, Koenigstein.



1. *Callistosporium luteolivaceum*



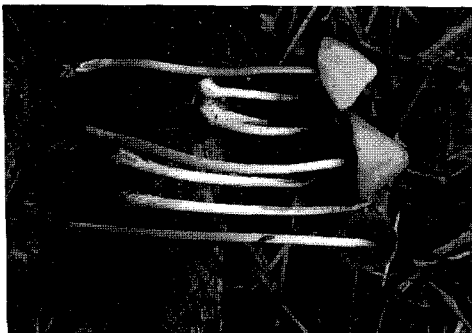
2. *Volvariella surrecta*



3. *Xerocomus parvulus*



4. *Boletellus elatus*



5. *Psathyrella subatrata*



6. *Volvariella subtaylori*

Photos of carphophores

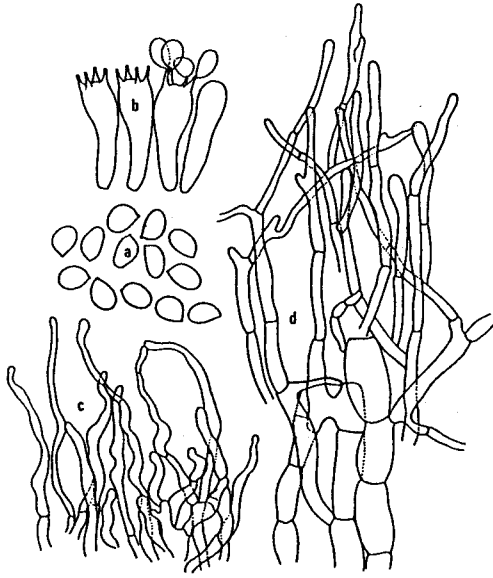


Fig. 1. *Callistosporium luteolivaceum*
a: spores, b: basidia, c: cheilocystidia, d: stipeipellis

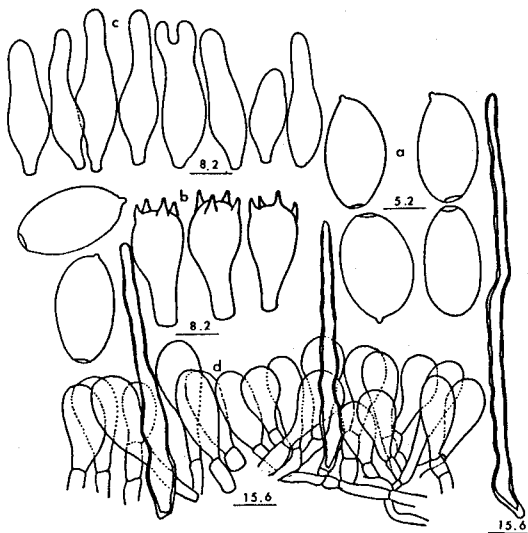


Fig. 2. *Psathyrella subatrata*
a: spores, b: basidia, c: cheilocystidia, d: pileipellis and setae

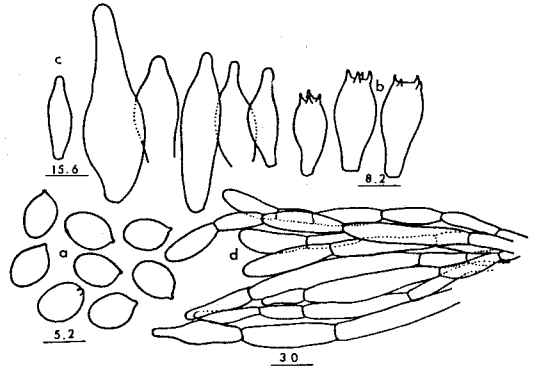


Fig. 3. *Volvariella subtaylori*
a: spores, b: basidia, c: cheilocystidia, d: hairs of capsurface

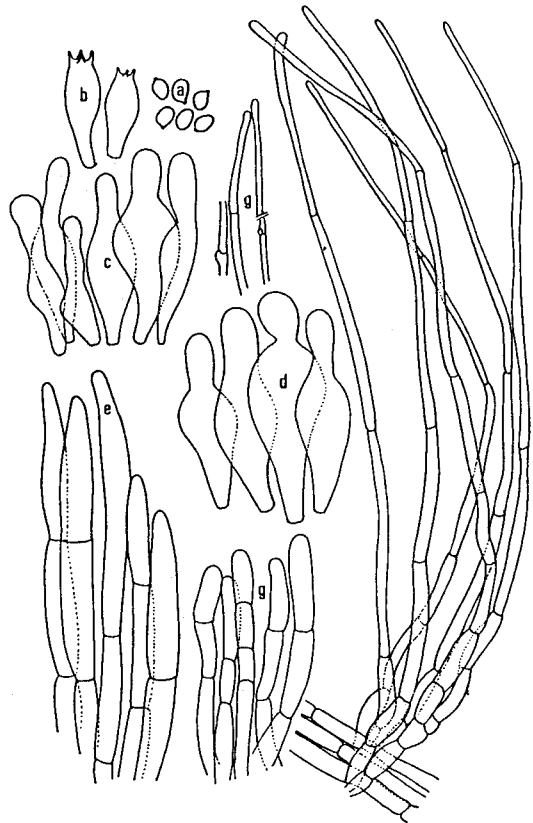


Fig. 4. *Volvariella surrecta*
a: spores, b: basidia, c: cheilocystidia, d: pleurocystidia, e: pileipellis, f: hairs at the base of stipe, g: terminal cells of volva

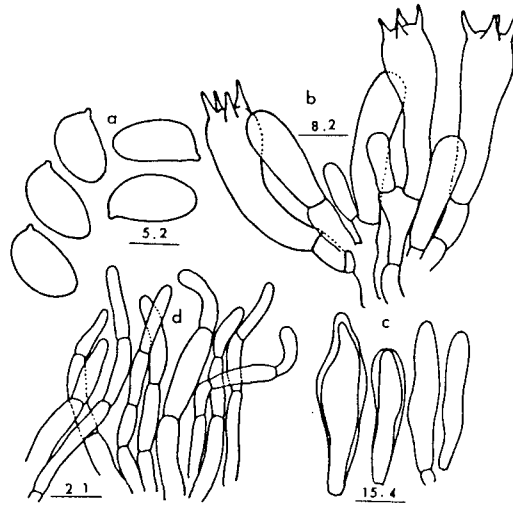


Fig. 5. *Xerocomus parvulus*
 a: spores, b: basidia, c: cheilocystidia, d: cap surface

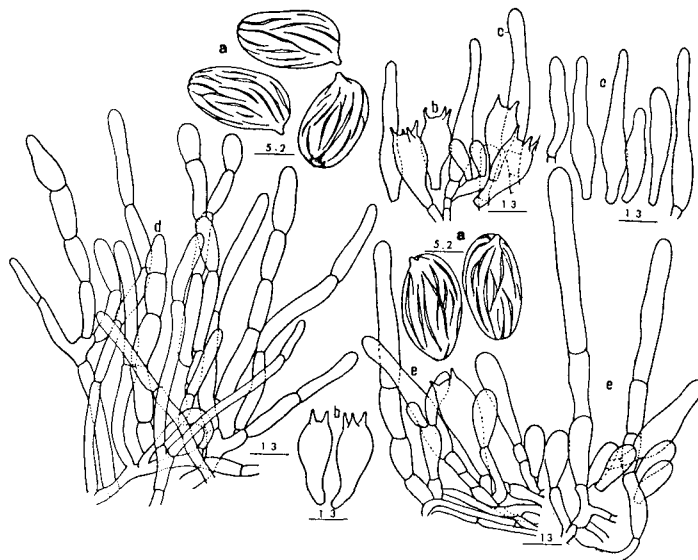


Fig. 6. *Boletellus elatus*
 a: spores, b: basidia, c: cheilocystidia, d: cap surface, e: stipe surface basidia and caulocystidia